United States Department of the Interior

FISH AND WILDLIFE SERVICE
P.O. Box 1306
Albuquerque, New Mexico 87103

In Reply Refer To:
Region 2/ES-SE
2-21-F-92-403

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Memorandum

To: Assistant Regional Director, Federal Aid, Region 2

From: Regional Director, Region 2

Subject: Biological Opinion of Federal Aid's transfer of Funds to the Arizona Game and Fish Department for Nonnative Fish Stocking Nelson Reservoir, Blue Ridge Reservoir, and Knoll Lake

This responds to your request of May 1, 1995, for formal consultation pursuant to the Endangered Species Act (Act) of 1973, as amended, (16 U.S.C. 1531 et seq.) on the stocking of rainbow trout (Oncorhychus mykiss) into subject waters of the Little Colorado River (LCR) drainage. The species of concern in this consultation is the Little Colorado spinedace (Lepidomeda vittata) and its designated critical habitat. This document represents the U.S. Fish and Wildlife Service's (Service) biological opinion on the effects of subject action in accordance with section 7 of the Act of 1973, as amended.

Project area encompasses portions of Apache County (Nelson Reservoir) and Coconino County (Blue Ridge Reservoir and Knoll Lake) in Arizona. The 90-day consultation began on May 5, 1995, the date your request was received by the Arizona Ecological Services State Office (AESO).

This Biological Opinion was prepared using information contained in the intra-Service section 7 evaluation forms, data in Service files, published and grey literature, and other information sources.

BIOLOGICAL OPINION

It is my biological opinion that the Service's continued support of the Sport Fish Restoration Program to the Arizona Game and Fish Department (AGFD) to stock tagged rainbow trout into three locations in the LCR Basin is not likely to jeopardize the continued existence of the threatened Little Colorado spinedace (spinedace) and that designated critical habitat for the spinedace is not likely to be adversely

affected by the stocking of tagged rainbow trout in the areas proposed for stocking.

BACKGROUND INFORMATION

Consultation History

The Service's Division of Federal Aid, Region 2, is the action agency in this consultation. Federal Aid, through the Sport Fish Restoration Program (Dingell-Johnson & Wallop-Breaux), provides financial support to Arizona's sport fish stocking program. Informal consultation between Fisheries/Federal Aid and the AESO was initiated in 1992 on a Statewide fish stocking program in Arizona.

On March 16, 1995, Federal Aid determined that the proposed stocking of catchable rainbow trout in Nelson, Blue Ridge, and Knoll impoundments "is not likely to adversely affect" spinedace nor adversely modify designated critical habitat. Federal Aid asked AESO concurrence. On April 7, 1995, the AESO found that concurrence could not be granted and that formal consultation should proceed. Formal consultation was initiated on May 5, 1995. As a result of ongoing section 7 consultation, AGFD has not stocked Nelson, Knoll, or Blue Ridge impoundments since 1993.

On August 2, 1995, the Acting State Supervisor (Arizona) issued a Biological Opinion on the stocking of the three impoundments. Release of the Biological Opinion followed an expression from the Federal Aid Office that time might allow stocking of the three impoundment prior to the Labor Day holiday should completion of the document be expedited. Such action assumed that the Biological Opinion would not find such action jeopardized the continued existence of the spinedace nor adversely modified the species' critical habitat. To expedite the Biological Opinion, the August 2, 1995, release failed to conform to established Service Policy regarding opportunity for Intra-Service review and issuance of the Biological Opinion by the Regional Director. This document has been prepared to correct those deficiencies and supersedes the August 2, 1995 release. This document is the Biological Opinion of Record on the proposed stocking of rainbow trout into Nelson, Blue Ridge and Knoll impoundments.

Description of Proposed Action

The proposed action is the continuation of a modified program to stock sport fish into three locations in the LCR basin. This action is funded, in part, by the Service's Sport Fish Restoration Program. All three stocking sites have the following precautions built into the project: (1) the State will stock catchable rainbow trout only; (2) all stocked fish will be marked with coded wire tags; (3) stocking will be delayed until flow over the affected dam ceases; and (4) monitoring will be conducted to determine whether movement of tagged trout from the three impoundments occurs. This consultation covers the stocking of

catchable rainbow trout for a 5-year period, January 1, 1996, to December 31, 2000 (under the put-and-take stocking regime planned, the next stocking of these three lakes will occur in 1996). The number of trout stocked in each impoundment varies depending on impoundment size, fish availability, and fishing pressure exerted. Stocking occurs roughly between Memorial Day and Labor Day. Although fishing occurs year-around, winter fishing is generally limited due to ice cover that precludes open water fishing but is not sufficient to support ice fishing.

Project specifics are discussed below.

Nelson Reservoir

Created in 1892, Nelson Reservoir is a 60-acre reservoir located near the Arizona/New Mexico border in the Apache-Sitgreaves National Forest on Nutrioso Creek in Apache County. Nelson Reservoir will be managed as a put-and-take rainbow trout fishery. The reservoir has an average depth of 2.5 meters (m) [8.3 feet (ft)] with a maximum depth of 7.5 m (24.6 ft) (Novy and Jones 1988). Prior to 1994, all three impoundments were managed as a put-grow-and-take fishery consisting of various combinations of brook, brown, cutthroat, and rainbow trout; trout were generally stocked as fingerling, allowed to grow to catchable size in the impoundment before being harvested by anglers. Under this regime, fingerling fish assumed wild characteristics and survived throughout the year. Because of concern that wild trout were surviving year round, moving to areas where spinedace occur and may have been preying upon or competing with spinedace, the AGFD has proposed to convert to a put-and-take program to maximize sport fish harvest while avoiding possible adverse impacts to spinedace or their critical habitat.

Stocking at Nelson Reservoir includes the following provisions:

1. Stock to maintain put-and-take rainbow trout fishery providing 20,000 angler days annually.

2. All stocked fish to be tagged with coded wire tags.

3. Stocking to begin each year as soon as practical following spring runoff and outflow from reservoir ceases.

4. Cease stocking if/when habitat conditions (temperature, pH) deteriorate, but no later than Labor Day.

5. Initial stocking rate to be 20,000 catchable rainbow trout per year, but adjusted to accommodate angler use, fish survival, and water conditions.

6. Monitoring:

   a. Creel census to be stratified random, 2 weekday, 2 weekend/holiday per month during the period April - September.

   b. Population surveys, upstream and downstream from the reservoir,conducted during low flow periods (May - June, September - October) to detect movement of tagged fish should they migrate from the reservoir.

Blue Ridge Reservoir

Blue Ridge Dam was completed and water impoundment began in 1964. This 70-acre reservoir has a total capacity of 19,500 acre-feet. The reservoir spills at 15,000 acre-feet, an elevation of 6,720 feet (Smith et al. 1994). Located on the Coconino National Forest in the upper reaches of East Clear Creek in Coconino County, Blue Ridge Reservoir will be managed as a put-and-take trout fishery. Near by critical habitat includes sections of East Clear Creek immediately upstream and downstream from Blue Ridge Reservoir. In previous years, the stocking program for Blue Ridge Reservoir included catchable rainbow trout and rainbow and brown trout fingerlings. Trout were maintained in the reservoir throughout the year. Under the proposed put-and-take program only catchable rainbow trout will be stocked. Stocking will be restricted to the period following spring run-off and end no later than Labor Day weekend. Blue Ridge Reservoir is expected to support approximately 15,000 angler days of sport fishing annually.

Stocking at Blue Ridge Reservoir includes the following provisions:

1. Stock to maintain put-and-take rainbow trout fishery.

2. All stocked fish to be tagged with coded wire tags.

3. Stocking to begin each year as soon as practical following spring runoff and outflow from the reservoir ceases.

4. Cease stocking if/when habitat conditions (temperature, pH) deteriorate but prior to Labor Day.

5. Initial stocking rate to be 15,000 catchable rainbow trout per year, but adjusted to accommodate angler use, fish survival, and water conditions.

6. Monitoring:

a. Creel census to be stratified random, 2 weekday, 2 weekend/holiday per month during the period April - September.

b. Population surveys upstream and downstream from the reservoir to be conducted during low flow periods (May - June, September - October) to detect movement of tagged fish should they migrate from the reservoir.

Knoll Lake

This 55-acre lake is located in upper Leonard Canyon on the Coconino National Forest in Coconino County. Knoll Lake, will be managed as a put-and-take rainbow trout fishery. In previous years, Knoll Lake was stocked with catchable rainbow trout and fingerling brown trout; approximately 20,000 angler days of sport fishing were provided annually. Stocking will begin after the snowpack runoff and end no later than the following Labor Day weekend. Historically, spinedace have occurred upstream and downstream of Knoll Lake. Spinedace are consistently found in Dines Tank, approximately 4 1/2 miles downstream (i.e. north) of Knoll Lake (Blinn and Runck 1993) but not downstream from Dines Tank (Minckley 1984). Critical habitat includes that area approximately 15 miles downstream from Knoll Lake where Leonard Canyon meets East Clear Creek then upstream in East Clear Creek to the dam at Blue Ridge Reservoir.

Stocking at Knoll Lake includes the following provisions:

1. Stock to maintain put-and-take rainbow trout fishery.

2. All stocked fish to be tagged with coded wire tags.

3. Stocking to begin each year as soon as practical following spring runoff and outflow from the reservoir ceases.

4. Cease stocking if/when habitat conditions (temperature, pH) deteriorate, but prior to Labor Day.

5. Initial stocking rate to be 20,000 catchable rainbow trout per year, but adjusted to accommodate angler use, fish survival, and water conditions.

6. Monitoring:

    a. Creel census to be stratified random, 2 weekday, 2 weekend/holiday per month during the period April - September.

b. Population surveys to be conducted upstream and downstream from the reservoir during low flow periods (May - June, September - October) to detect movement of tagged fish should they migrate from the reservoir.

Species Description

The spinedace is a cyprinid native to the LCR drainage. This fish occurs in scattered disjunct populations throughout much of the LCR drainage including Apache, Coconino, and Navajo Counties. The species was listed as threatened with critical habitat designated on October 16, 1987. Forty-four stream miles of critical habitat were designated: eighteen miles of East Clear Creek immediately upstream and 13 miles downstream from Blue Ridge Reservoir in Coconino County, 8 miles of Chevelon Creek in Navajo County, and 5 miles of Nutrioso Creek in Apache County.

The species was described in 1874 by E.D. Cope (Miller and Hubbs 1960). Extensive collections summarized by Miller (1963) indicated the spinedace had been extirpated from much of this historic range during the period 1939 to 1960. Although few collections were made of the species prior to 1939, the species is believed to have inhabited the northward flowing tributaries off the Mogollon Rim, including the northern slopes of the White Mountains.

The spinedace is a small [100 millimeter (mm)] minnow with olivaceous, bluish or lead grey coloration. Habitat requirements include a wide range of stream habitats ranging from stagnant pools to permanent flowing water, and with stream substrates ranging from fine sediments to bedrock. Water temperatures in habitats occupied ranged from 58 to 78 degrees (Miller 1963). Miller (1963) called the spinedace "trout like" in behavior and habitat requirements. It is likely, that prior to 1900 the spinedace used habitats now dominated by nonnative salmonids.

Although the spinedace exhibits a wide tolerance of habitat types, their overall numbers appear to be declining. The primary reasons believed responsible for decline are changes in water quality and quantity, modification of watersheds (dams, road construction), and interactions with nonnative fishes.

Spinedace population estimates fluctuate drastically from year to year. Between 1963 and 1966, spinedace were readily found throughout much of the habitat where they had been collected in the recent past, indicating the species ability to persist through severe drought conditions and severe winter temperatures yet repopulate when physical conditions improved. Spinedace are late spring early summer spawners. Five spinedace populations are known to occur within the LCR: Chevelon, Silver, Nutrioso, East Clear Creek, and the LCR proper. Spinedace are currently considered rare in East Clear Creek; they have not been collected from

Silver Creek or its tributaries since the mid-1970s. The last collection of spinedace from the various populations are summarized below (Table 1).

Table 1. Known Populations of Little Colorado Spinedace

Spinedace locations	Last collection
CHEVELON	
above The Steps	1994
Hugo Meadow	1994
The Steps	1994
SILVER	
Silver Creek	1965
Cottonwood Wash	1974
NUTRIOSO	
above Forest Service boundary*	1994
upstream of Nelson*	1994
Corrego Crossing*	1990
Rudd Creek	1994
EAST CLEAR CREEK	
above Blue Ridge*	1994
below Blue Ridge*	1988
Leonard Canyon - Dines Tank*	1994
West-Leonard Canyon*	1994
Mid-Leonard Canyon*	1994
LITTLE COLORADO RIVER	
downstream of Salado	1939
Clear Creek	1960
Willow Creek	1965
upstream of Lyman	
downstream of Lyman	
Winema	1994

* Populations that may be affected by the proposed action.

Environmental Baseline

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species and its ecosystem. This analysis serves to define current status of the spinedace and to provide a contrast to the effects of the action under this consultation. While the baseline focuses on conditions in the action area, the analysis must include information also on the status of the species throughout its range. Any evaluation of the effects of the action under consultation must be made in the context of the species' overall status.

This environmental baseline is divided into two components: past actions and status of the species within the project area.

Past Actions

This section describes past and present impacts of all Federal, State, and private activities in the area of the proposed action, anticipated impacts of all proposed Federal activities in the action area that have already undergone formal or informal section 7 consultation, and impact of State or private activities which are contemporaneous with this consultation process. This is the first formal consultation on the potential effects of stocking nonnative trout into current or historical occupied spinedace habitat.

Blue Ridge Dam was completed and the reservoir began filling in December 1964. Located on the Coconino National Forest in the upper reach of East Clear Creek in Coconino County, Blue Ridge Reservoir will be managed as a put-and-take trout fishery. In previous years, catchable and fingerling trout were stocked. Gage data for Blue Ridge are available for the period 1984 to 1994. The spillway crest for the dam is at 15,000 acre-feet. Between 1984 and 1994, the water level rarely exceeded this level in early May. However, in 1992, the reservoir was above 15,000 acre-feet throughout most of May, into early June, and then again in late August and early September (USGS Water Data Report AZ 94-1).

Nelson Reservoir was created in 1892 to provide irrigation water for the Round Valley area. The AGFD first introduced trout into the reservoir in 1958. During the years at followed, rainbow, brown, brook, and cutthroat fingerlings have been stocked. In the past AZGF, managed Nelson Reservoir as a Basic Yield System (Novy and Jones 1988), meaning fingerling or sub-catchable trout were stocked, and allowed to grow to catchable size before being harvested by anglers. The reservoir capacity has been reduced by siltation (Novy and Jones 1988). In 1983, the water rights for the reservoir were transferred from irrigation to recreation, thus eliminating the loss of water for irrigation. As a result, the water level of the reservoir remains near spillway elevation most of the year (Novy and Jones 1988).

Knoll Lake is located in upper Leonard Canyon on the Coconino National Forest in Coconino County. Between 1996 and 2000, this area will be managed as a put-and-take trout fishery. In previous years, Knoll Lake was stocked with catchable rainbow trout and brown trout fingerlings. Knoll Lake Dam has been inspected annually during most years during the period 1983 through 1993 (R. Perkins, written communication, AZESO Files). Information in Table 2 suggests that water levels may approach spill levels at times during the stocking season.

Table 2. 1983-1989, and 1991-1993 annual water measures (feet) below spillway at Knoll Lake.

Date	Distance Below Spillway (feet)
July 1993	3.8
Aug 1992	3.0
July 1991	4.5
July 1989	13.9
July 1988	5.0
July 1987	4.5
June 1986	4.7
June 1985	1.5
June 1984	5.8
July 1983	2.3

Status of the Species in Project Area

Project analysis must consider existing fragile condition of the aquatic community inhabited by spinedace. Stream and watershed alterations have greatly reduced the diversity and complexity of spinedace habitat. Human impacts on the upper LCR watershed include an increase in stream sedimentation; an apparent impact from logging, or road construction, modification of stream channels; dam construction for diversion or impoundment, and introduction of nonnative fish; all have modified historical habitat and influenced spinedace distribution and abundance. The use of piscides as a fish management tool and subsequent introduction of nonnative fish have impacted the spinedace (Minckley 1984). East Clear, Chevelon, and Nutrioso creeks are vulnerable to the effects of channelization, impoundments, groundwater pumping, and water diversion. In addition to fish, a variety of animals including Belostomatid insects and snakes are known to prey on spinedace (Blinn et al 1993; Blinn and Runck 1990).

Surveys conducted in 1961 found a large population of spinedace in East Clear Creek (Miller 1961); however their distribution and abundance has since been greatly reduced (Denova and Abarca 1992). Spinedace have not been collected downstream of Blue Ridge Reservoir (96 crossing) since 1988. However, rainbow

and brown trout were collected in the area at Horse Crossing in 1994 (Kirk Young, AGFD, pers. comm.).

Stream flow is discontinuous between Knoll Lake and Dines Tank in Leonard Canyon. Spinedace have not been recorded in the area immediately downstream of Knoll Lake. However, they are found consistently in Dines Tank. The Dines Tank population may serve as an important refugium for the species. Spinedace were also collected in Middle and West Leonard Canyon in 1994 (Jim White, Northern Arizona University, AZESO Files).

Spinedace in Nutrioso may be coping better, with additional populations found in Nutrioso and Rudd Creek (tributary to Nutrioso Creek). These finding are significant because Rudd Creek and associated water rights have been acquired recently by AZGF providing additional protection for the species. Spinedace were last collected upstream of Nelson Reservoir in 1990 (Kirk Young, AZGF, pers. comm.).

EFFECTS OF THE ACTION

There are three stocking areas under consideration. The types of effects, their magnitude, and degree of risk may vary from year to year depending on weather conditions, snowpack runoff, and local conditions.

Direct and Indirect Effects

The proposed project may result in rainbow trout entering spinedace habitat. The Biological Evaluation that was provided assumes static conditions over the life of the project and fails to recognize variations in hydrology which may result in the reservoirs unanticipated spilling or other long-term impacts of continuing annual stocking of catchable trout. All three stocking sites have the precaution built into the proposed action that trout will not be stocked until after the snowpack runoff to minimize movement of trout from the reservoir. Strict adherence to this requirement could delay stocking until some time following Memorial Day weekend. During years of very high runoff, stocking could be delayed indefinitely.

Even with this provision in place, unavoidable spills are possible, as seen from Blue Ridge Dam in 1992, when the reservoir was above 15,000 acre-feet throughout most of May, into early June, and then again in late August and early September.

Information on flows downstream from Nelson Reservoir is not available. However, maximum depth does not vary greatly within the year. Between 1983 and 1987 maximum water depth ranged from 7 meters (23 feet) to 7.5 meters (24.6 feet), reaching the peak in July, the middle of the fishing season. Because

irrigation drawdowns no longer occur, Nelson Reservoir remains at spillway elevation much of the year (Novy and Jones 1988). Blinn and Runck (1993) report that Nelson Reservoir spills each spring, "... possibly introducing rainbow trout into lower Nutrioso Creek." During 1991 and 1992 isolated pools downstream from Nelson were sampled and consistently found an inverse relationship between spinedace and rainbow trout numbers. In 1994, spinedace numbers increased in Nutrioso Creek from 1993 levels at Correjo Crossing and at the Rudd Creek/Nutrioso Crossing (Kirk Young, AGFD, pers. comm.). Note, trout were not stocked in Nelson Reservoir during 1994. Information on flows below Knoll is likewise not available, but spinedace are found consistently in Dines Tank in Leonard Canyon. It is understood that spinedace numbers within a given population vary from year to year and that a combination of factors are believed to influence such fluxuations.

Spring fish stockings will not occur until after spring runoff to prevent possible displacement of spinedace by stocked trout should they move downstream. There are no similar precautions available to limit upstream movement of trout. Stream barriers do not exist to prevent fish movement upstream from Nelson, Knoll, or Blue Ridge reservoirs. All three incoming drainages are generally dry during the majority of the stocking season in a year of average precipitation, and do not provide habitat for either spinedace or trout. Spinedace have not been collected above Nelson since 1990. Spinedace were last collected above Blue Ridge (Jones Crossing) in 1993 (Kirk Young, AGFD, pers. comm.). AGFD has proposed fish barriers in Leonard Canyon above Knoll Reservoir, in East Clear Creek above Blue Ridge, and in Nutrioso Creek above Nelson Reservoir (Project FW-20-D-19) (J. Burton, AGFD, pers. comm.). However, these projects have not been designed or funded, and are not part of this proposed action. During wet years or during periods of high runoff, stocked trout could potentially move out of the stocked areas and move into spinedace habitat. Similarly, spinedace could move into habitats supporting trout.

Miller (1963) and Blinn et al (1993) hypothesized that spinedace have not historically been associated with fish predators. However, headwaters of the LCR originate along the northern slopes of Mount Baldy. Most stream originating from Mount Baldy still support Apache trout. It is possible that Apache trout co-existed historically with spinedace at some elevations in the Little Colorado River.

Sampling efforts by AGFD from May 1990 to November 1991 reported eight species of nonnative fishes in East Clear Creek drainage (fathead minnow, rainbow, brook, brown trouts, golden shiner, plains killifish, green sunfish, and channel catfish) (Denova and Abarca 1992). Common carp, bluegill, largemouth bass, and red shiner have also been found to co-exist with spinedace. Native fishes associated with spinedace include speckled dace, bluehead sucker, Little Colorado sucker, roundtail chub, and Apache trout (Minckley 1994). The presence of

nonnatives may contribute to the disjunct distribution patterns observed and the species retreat to what may be suboptimal habitats for spinedace. Nonnative fish may compete with, prey upon, harass, and alter habitat utilized by native fish fauna. Although spinedace numbers fluctuate greatly, overall, their numbers appear to be declining.

Stocked rainbow trout in the Blue Ridge, Knoll, and Nelson impoundments are subject to heavy fishing pressure by anglers. Under the planned management regime of put-and-take stocking, few if any, trout are expected to overwinter. However, some carry over of trout is possible. The AGFD coldwater strategic plans call for a return to the creel of at least 50 percent on put-and-take trout fisheries (J. Janish, AZGF, personal communication). Most put-and-take fish are caught by anglers, preyed upon by various other predators, or succumb to other causes. The number of stocked fish which overwinter in the stocked areas is considered insignificant.

However, the few fish which do overwinter are harvested at a much larger size and are prized by anglers. At one time Nelson Reservoir held the inland state record for rainbow trout (5.02 kg) (Novy and Jones 1988).

Blinn and Runck (1990) and Blinn et al (1993) documented rainbow trout predation on spinedace in aquaria and stream enclosures. Under the put-and-take program of stocking catchable size trout (rainbow only) it is anticipated that the trout will either be caught by anglers or die before leaving the lake. All stocked trout will be tagged and stream segments immediately upstream and downstream from each of the three impoundments will be surveyed periodically to determine if stocked trout are leaving the reservoirs.

Naturally reproducing trout populations occur in some stream segments of the Little Colorado River. The ancestors of these fish were probably stocked as fingerlings into the stream or reservoirs prior to 1993, by Service and AGFD in support of a recreational fishery. This management techniques requires that fingering trout adapt to the stream or reservoir environment to which they have been introduced. Put-grow-and-take provides anglers opportunity to take fish that exhibit wild fish characteristics and behavior, but harvest opportunity is delayed until fish grow to harvest size. Stocking of catchable size fish make them immediately available to anglers negating the need for extended survival in the wild thus minimizing carryover beyond the fishing season and lessens the probability of these larger fish contributing to a self-sustaining population. Salmonids (brook, brown, and rainbow), which have not been stocked since 1993, survive in waters of the Little Colorado basin (AGFD files).

Rainbow trout predation on spinedace was demonstrated by Blinn and Runck (1990) in aquaria experiments. Trout obtained from Nutrioso Creek consumed

spinedace in aquaria with and without rocks provided for cover. Spinedace did not appear capable of avoiding trout predation when placed in aquaria. The largest spinedace consumed by a rainbow trout was 71 mm; the trout was 240 mm (Blinn and Runck 1990). However "domesticated" trout obtained from the Page Springs hatchery did not consume spinedace.

Following laboratory experiments, experiments were performed in Nutrioso Creek enclosures. Wild rainbow trout and spinedace (all from Nutrioso Creek) were placed in 2 by 3 meter enclosures and fish interactions monitored. Although spinedace disappeared from enclosures with and without trout, significantly more spinedace were lost from enclosures that contained wild rainbow trout (Blinn et al. 1993). Even though macroinvertebrates were abundant in the enclosed areas, trout consumed spinedace. Trout presence also modified spinedace behavior. In the presence of trout, spinedace moved into open water possibly making them more vulnerable to a wide variety of predators (Blinn and Runck 1990; Blinn et al. 1993).

An inverse relationship between trout and spinedace abundance and distribution occurs throughout Nutrioso Creek (Blinn and Runck 1990; Blinn et al. 1993). The uppermost area of Nutrioso Creek contained a healthy population of trout, the area just downstream had a few trout and spinedace, while the area still farther downstream had only spinedace (Blinn and Runck 1990). This pattern is further confirmed by the consistent presence of spinedace in Dines Tank and the absence of rainbow trout. While it is recognized that other variables such as water temperature, stream gradient, etc. may affect abundance and distribution of both species, it is possible that spinedace populations may not be able to maintain or increase their numbers in the presence of non-native fishes. Providing habitat free of non-native fish may be crucial to spinedace recovery.

Critical Habitat

Critical habitat designation for spinedace occurred before the requirement to identify constituent elements or habitat qualities necessary to allow a species to survive and recover from extinction was added. Therefore, the best scientific and commercial data available were used to determine those characteristics of the designated critical habitat that support the species' survival and recovery. (See Draft Recovery Plan - USFWS 1994).

Critical habitat affected by this action include the following 36 miles of stream:

East Clear Creek - 13 miles above Blue Ridge from the upper end of the reservoir to Potato Lake area; the 18 miles below Blue Ridge Dam to the East Clear Creek - Leonard Canyon confluence;

Nutrioso Creek - 5 miles of stream below Nelson Reservoir dam to the Apache-Sitgreaves National Forest.

Currently no barriers exist to prevent upstream movement of trout into designated critical habitat upstream of Blue Ridge reservoir. Likewise there are no barriers to prevent downstream movement of trout from Blue Ridge or Nelson Reservoirs other than the dams that impound the stream. When critical habitat areas for spinedace were designated, these areas were reported as "...presently support(ing) healthy self-perpetuating populations of the Little Colorado spinedace" (USFWS 1987). Since that time, habitat degradation, introduction of non-native fishes, and scarcity of water have resulted in low numbers of spinedace in East Clear Creek and Leonard Canyon. In years of high precipitation or during periods of high runoff, trout have the opportunity to move out of stocked area into spinedace habitat. Similarly, spinedace may move into trout areas. In either case, some spinedace could be consumed by rainbow trout.

Movement of predaceous fish into designated critical habitat may contribute to the disjunct distribution patterns and retreat of spinedace to suboptimal habitats. Results may include competition, predation, harassment or further loss of spinedace.

The act of stocking catchable rainbow trout upstream and downstream of critical habitat is reversible and does not diminish or preclude the role of that habitat for the survival and recovery of the spinedace. The proposed action does not appreciably diminish the value of the constituent elements essential to the conservation of the spinedace. Therefore, the adverse modification threshold is not exceeded.

Cumulative effects

Cumulative effects are those effects of future State or private activities that have no Federal connection, but are reasonably certain to occur within the action area of this consultation. Projects without a Federal nexus may require section 10(a) permits (Habitat Conservation Plans) to comply with section 9 of the Act.

The cumulative effects of rainbow trout in spinedace habitat may be an important factor. In addition to the stocking programs established by AGFD or the Service's Fisheries Program, there are private water bodies which are stocked in the area. Spinedace may also be affected by accidental or intentional transfer of fishes into or within the LCR drainage. Although State law prohibits the use of bait fish in the LCR watershed, the opportunity for transfers from bait buckets to spinedace habitat may occur illegally. The dumping of nonnative fish no longer wanted by individuals, culturists, and distributors is a threat that must be recognized.

When they occur, private introductions of nonnative fishes will likely have an adverse effect on the spinedace. The delay in the trout stocking program has frustrated some members of the private sector, including anglers; some have threatened to stock fish in the absence of State or Federal programs. Given the nature of the area, actions from the private sector could affect spinedace survival.

INCIDENTAL TAKE STATEMENT

Sections 4(d) and 9 of Act, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided such taking is in compliance with the terms and conditions of this incidental take statement.

The purpose of stocking rainbow trout is to provide recreational fishing opportunity for anglers. If stocked rainbow trout consume spinedace, it would be incidental to the proposed action. The stocking of hatchery-reared, catchable rainbow trout, anticipated high angling pressure, and management provisions listed for each reservoir are designed to prevent rainbow trout from migrating from the three reservoirs into spinedace habitat. Requiring that coded wire tags be placed into all trout stocked into the three reservoirs will assist in determining if stocked rainbow trout move from the reservoirs into spinedace habitat. But, regardless of these precautions, it is possible that incidental take of some unknown number of spinedace may occur. In addition to the direct take some 36 of the 44 miles of critical habitat are likely to be affected by this action.

The measures described below are non-discretionary, and must be implemented by the agency so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply.

The Service anticipates incidental take of spinedace will occur but difficult to quantify for the following reason(s): finding a spinedace that has been eaten by a

rainbow trout is unlikely; and opportunity to evaluate effects of rainbow trout on spinedace behavior that results in harassment or mortality will be infrequent.

To minimize incidental take, the following Reasonable and Prudent Measures must be implemented.

Reasonable and Prudent Measures

Reasonable and prudent measures are to minimize adverse effects on the specific individuals or habitat affected by the action.

1. Evaluate food habits of tagged rainbow trout collected in designated critical habitat or habitat occupied by spinedace.

2. Minimize opportunity for interaction between spinedace and stocked rainbow trout as described in the following terms and conditions.

Terms and Conditions

The following terms and conditions implement reasonable and prudent measures described above. Implementation of all terms and conditions is required to be in compliance with section 9 of the Act. Federal Aid in conjunction with the AGFD will ensure the following terms and conditions are accomplished.

1. For each of the three impoundments, adjust stocking schedule as necessary to avoid stocking until water level is below spillway level and expected to remain so until the end of the stocking season. Unexpected spills may interrupt pre-scheduled stockings.

2. Stock only hatchery reared catchable size rainbow trout that have been tagged with coded wire tags.

3. Stock trout to coincide with the summer fishing season, the approximate period being Memorial Day to Labor Day.

4. Conduct stream surveys, upstream and downstream of each of the three reservoirs, to determine whether tagged rainbow trout are moving to connecting streams. If tagged trout are collected from areas occupied by spinedace, stomachs are to be taken and attempts made to determine if spinedace are being consumed by the tagged trout.

5. Provide AESO results of monitoring activities listed in number 4 annually.

The level of incidental take will be considered to be exceeded if it is determined that tagged rainbow trout migrate to spinedace habitat and consume spinedace in numbers that prevent maintenance of existing populations. Parameters used to make this determination, and require reinitiation of consultation will be either the collection of spinedace taken from tagged trout stomachs or collection of tagged trout from occupied spinedace habitat. Consultation will be initated on the three reservoirs individually if more than 1 spinedace is taken from the stomachs of tagged trout or collection of more than 10 tagged trout occur during the .

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of Act directs Federal Agencies to utilize their authorities to further the purposes of Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. These recommendations relate only to the proposed action and may not accomplish all of an agency's section 7(a)(1) responsibilities.

The AGFD has responsibility for management of native fish and wildlife resources in Arizona. With listed species that responsibility is shared with the Federal Government. The Services supports recreational fishing and understands the need to manage nonnative fish to support that program. The Service also supports efforts to maintain diversity of the native fauna and is mandated to recover plant and animal species that are listed as threatened or endangered by the Federal Government. Spinedace distribution is limited to the LCR drainage; therefore, its habitat lies completely within the State of Arizona. Because the proposed action precipitating consultation deals with the use of Federal funds to assist in the maintenance of stocking nonnative trout into the LCR drainage, and through cooperative efforts between the AGFD and the Service to recover the spinedace, the following information is requested.

1. Submit a list of actions considered necessary by the AGFD to maintain or enhance recreational fishing opportunity while proceeding with spinedace recovery.

2. Submit a list of actions deemed necessary by the AGFD to recover the spinedace. Such action may or may not be duplicates of actions contained in the soon to be approved recovery plan for this species.

3. Evaluate potential of using native Apache trout in lieu of rainbow trout in acceptable habitats in the LCR watershed to provide recreational fishing opportunity.

CONCLUSION

This concludes formal section 7 consultation on the stocking of rainbow trout into Blue Ridge Reservoir, Nelson Reservoir, and Knoll Lake, as described in your request for consultation. As required by CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; or (3) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

In future communications on this project, please refer to consultation number 2-21-92-F-403. If there are any questions about this biological opinion, please contact Debra Bills or Ted Cordery.

Lynn B Starnes

cc:
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Director, Arizona Department of Game and Fish, Phoenix, Arizona

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SUMMARY
BIOLOGICAL OPINION ON THE U.S. FISH AND WILDLIFE'S
FEDERAL AID SUPPORT
TO ARIZONA GAME AND FISH DEPARTMENT
SPORT FISH STOCKING INTO
NELSON, KNOLL, AND BLUE RIDGE RESERVOIRS

Date of the opinion:

Agency: U.S. Fish and Wildlife Service - Federal Aid

Project: Stocking of catchable (8-10 inch) rainbow trout into Nelson Reservoir, Blue Ridge Reservoir, and Knoll Lake

Listed Species and critical habitat: Little Colorado spinedace (Lepidomeda vittata) (spinedace) and designated critical habitat

Biological opinion: No jeopardy for the spinedace. No adverse modification of critical habitat.

Incidental take statement:

Level of take anticipated: The level of incidental take will be considered to be exceeded if it is determined that tagged rainbow trout migrate to spinedace habitat and consume spinedace in numbers that prevent maintenance of existing spinedace populations. Parameters used to make this determination, and require reinitation of consultation will be either the collection of spinedace taken from tagged trout stomachs or collection of tagged trout from occupied spinedace habitat. Consultation on the stocking of the three individual impoundments will be initiated if more than 1 spinedace is taken from the stomachs of tagged trout or collection of more than 10 tagged trout.

Anticipated take is not quantifiable, but will be considered to have been exceeded if it is determined that tagged rainbow trout migrate to spinedace habitat and consume spinedace in numbers that prevent maintenance of existing spinedace populations. Parameters used to make this determination, and require reintiation of consultation will be either the collection of spinedace taken from tagged trout stomachs or collection of tagged trout from occupied spinedace habitat. Consultation will be reinitiated if more than 1 spinedace is taken from the stomachs of tagged trout or collection of more than 10 tagged trout are collected from the affluent and or effluent of the three individual reservoirs. Data for each reservoir and connecting stream segments (reservoir system) will be computed separately for each reservoir system with consultation required on a reservoir by reservoir basis. Collection of more than 1 spinedace from tagged trout stomachs

or more than 10 tagged trout collected following their escape from the affected reservoir system will require reinitation of consultation for that reservoir system.

Reasonable and prudent measures and terms and conditions:

1. For each of the three impoundments, adjust stocking schedule as necessary to avoid stocking until water level is below spillway level and expected to remain so until the end of the stocking season. Unexpected spills may interrupt prescheduled stockings.

2. Stock only hatchery reared catchable size rainbow trout that have been tagged with coded wire tags.

3. Stock trout to coincide with the summer fishing season, the approximate period being Memorial Day to Labor Day.

4. Conduct stream surveys, upstream and downstream of each of the three reservoirs, to determine whether tagged rainbow trout are moving to connecting streams. If tagged trout are collected from areas occupied by spinedace, stomachs are to be taken and attempts made to determine if spinedace are being consumed by the tagged trout. Surveys of the reservoir fish population to determine survival and carryover of stocked trout is encouraged.

5. Provide AESO results of monitoring activities listed in number 4 annually.

CONSERVATION RECOMMENDATIONS

Conservation recommendations are discretionary actions in terms of section 7 compliance. The Service is committed to the recovery of the spinedace and recommend the following measures be taken.

Because the proposed action precipitating consultation has to do with the use of Federal funds to assist in the maintenance of stocking non-native trout into the LCR basin, and also involves our cooperative efforts to recover the spinedace, the following information is requested.

1. Submit a list of actions considered necessary by AGFD to maintain or enhance recreational fishing opportunity while proceeding with spinedace recovery.

2. Submit a list of actions deemed necessary by AGFD to recover the spinedace. Such action may or may not be duplicates of actions contained in the soon to be approved recovery plan for this species.

3. Evaluate the potential of using native Apache trout in lieu of rainbow trout in acceptable habitats in the LCR watershed to provide recreational fishing opportunities.